

Attitudes of Golfers Towards  
the Characteristics of  
Naturalistic Golf Courses

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## Chapter One

### INTRODUCTION

Most golf courses that have been built in the United States have one main characteristic: "wall to wall" green grass. This quality of a highly manicured visual appearance achieved through labor intensive maintenance practices has existed on most golf courses in America since World War II. The golfing public has grown accustomed to this highly manicured appearance for several reasons, such as: 1) better varieties of turfgrass able to handle drought, insects, and fungus; 2) increased use of insecticides, fungicides, and herbicides; 3) irrigation of the entire golf course; and 4) exposure of this "image" through television coverage of professional tournaments such as The Masters at Augusta National Golf Club. With better television coverage of the Masters golf tournament, the golfing public was able to see what an idealized golf course "should" look like here in America -- many trees, water, wide fairways, long tees, and large greens, all intensively cultivated and maintained into this highly manicured appearance.

Within the last several years, however, some golf course architects are returning to an old concept, the "naturalistic look," which dates back to the source of the game of golf, Scotland. Golf courses in Scotland as well

as in Wales, Ireland and England utilize to a much greater extent than in America, the existing landscape features and visual character that land possesses. Their maintenance practices differ from American practices in that tees, fairways, greens, and very little of the rough receive attention while the rest of the golf course remains natural. The basic premise of a naturalistic course is to work with, not against, the existing features of the land, and incorporating into the design, the indigenous character of the site. Other characteristics included in naturalistic courses are: rolling fairways, contour mowing, hidden traps, blind shots, pot bunkers, and sod faced bunkers. In short, the process of naturalization involves a reduction in the level of care of roughs and hazards, a minimization of the size of the principal playing areas and a concentration of maintenance efforts on those smaller playing surfaces so as to leave as much of the landscape character of the course in a more natural condition.

It is my intent to undertake a research project that focuses on the determination of attitudes among golfers towards these changes in golf course design practices. The work will seek to find what golfers like and dislike in terms of playability and aesthetics concerning the naturalistic concept in golf course design. This will

help the golf course architect to better understand what golfers prefer in a naturalistic design. This may enable a course to have greater popularity because it is more playable to all types of golfers, as well as help in marketing of a project if the course is involved with housing development.

#### Importance of Study

This study is important to the golf course architect, the average golfer, the developer and residents of a golf community. The golf course architect can benefit by gaining a better understanding of what factors are important to the average golfer. This knowledge could assist in providing golf courses that are much more enjoyable to the average golfer. An example is Scankaty Head on Nantucket Island. This course has changed its concept from a more traditional American course to a Scottish course. The members approve of the change stating, "this is the way golf courses should be."

The average golfer can also benefit from this study in that golf course architects will better understand what the golfers like and dislike in naturalistic golf course architecture. By knowing what is important to the golfers, naturalistic golf courses may provide a more enjoyable environment than the more traditional American style golf course.



Golf course community developments are very expensive for a developer to undertake and to many of the residents desiring to live in a "first-home" golf course community. Having a better knowledge of what is important to the average golfer may help a golf course's reputation or popularity, which can aid in the selling of the development concept.

Several issues concerning the naturalistic style of golf course architecture will be determined, such as:

(1) Whether a golfer prefers to play a naturalistic or a more traditional highly manicured American style of golf course. Further studied are aspects related to the details of naturalistic golf courses such as depths of sand bunkers, distance of naturalized areas from the greens and fairways, and fairway mounding. This will enable the architect to make appropriate decisions on courses being installed. Also decisions may be made easier on the type of course, such as private, public, executive resort or in a course is related to a retirement community, or a "sister" course as the case at Oak Tree, Winged Foot, and Baltusral.

(2) To find out what positive views or complaints golfers have concerning the naturalistic style of golf course architecture.

### Scope of Study

This study involves average golfers who have played on a naturalistic golf course, and the golfer's attitude toward aesthetics and playability of this style of course. Aesthetics, in this case, has to do with the beauty of the golf course and the relationship the course has with the surroundings environment, both factors that contribute to a given visual or aesthetic character of a golf course development.

Playability has to do with how difficult the course is to all levels of golfers.

### Methodology

The primary method used for obtaining data has been through the use of a survey. Three golf courses, each having the characteristics of a naturalistic golf course, were selected for survey locations. Participants were given the questionnaire immediately after a completion of a round of golf. The questions dealt with their preferences pertaining to aesthetic factors and playability of naturalistic courses. The responses from the questionnaire data which was then entered into a computer and the results tabulated by number of responses to each answer and percentage of total responses. The results were then statistically analyzed. Conclusions about the golfers' attitudes were drawn from the analysis

of the results. A more detailed discussion of the methodology and conclusions can be found in Chapter Three.

#### Chapter Outline

Chapter two, the background portion of the thesis, discusses briefly the evolution of the game of golf, the past eras in golf architecture, and reasons which describe the changing attitudes toward how American golf courses should look and play. Chapter Three, the methodology, describes the research process undertaken for the study and operational definitions. This chapter also describes specifically the survey instrument design and the administration techniques used on the participants. Chapter Four reports the results of the survey in table form. Chapter Five discusses the major conclusions resulting from the research.

Chapter Two

BRIEF HISTORY CONCERNING THE  
EVOLUTION OF GOLF COURSES

The game of golf is a sport offering the opportunity for individuals to get outside and enjoy the environment. Playing golf in the fresh air can be a major source of well-being for an individual; this comes about from the strategy incorporated into the golf course together with the beauty a golf course possesses.

The game, consisting of the use of a club, a ball, and a hole, originated 500 years ago in Scotland. The first of these courses were found on the Scottish "linksland." The term "links" refers to Scottish courses located on sandy deposits left along the seacoast by the receding ocean. According to Cornish and Whitten (1981) this is only partially true because the North Sea may well have deposited rolling dunes of sand along the shoreline, but true linksland consisted of rich alluvial soil left upon the sand dunes by a river as it flowed into the sea. True links, then, would be golf courses formed by nature on or near river estuaries. Indeed, the game of golf was first played in Scotland along the estuaries of the rivers Eden, Tay and Forth (p. 16).

Nature was the sole designer of these earliest courses. The terrain usually dictated the routes a player

could follow on these early links courses. The dunes were to be avoided because gorse or heather shrubs and bent grass were the only vegetation growing on these dunes. There were no trees, ponds, or lakes, but there were many natural hazards. Sheep searching for cover in hollows or behind hillocks would wear down the turf. The dwellings of wildlife species would collapse, forming pits. Erosion of the topsoil by wind and water caused these pits to become the origins of what we know today as sand traps or bunkers. There were no tees, fairways, or putting surfaces on these ancient courses. Legend has it that rabbit holes were the first putting cups.

Possibly the first golf courses were just a single hole played out and back. The popularity of golf grew, however, and the number of courses grew as well. There was no standard length of a round of golf; some of the earliest links had five to 25 holes.

The best known golf course of this early period is the old links at St. Andrews in Scotland. Records indicate that in the year 1414, the Old Course existed in a primitive form.

Sometime during the middle of the eighteenth century, two events occurred that were very important to the game of golf. The first was the creation of private golf clubs, and the second, man began altering some of nature's

designs at St. Andrews. Some of these changes related to the configuration of the green and the lengthening of some of the golf holes. According to Cornish and Whitten (1981):

"The original natural links of Scotland, especially St. Andrews, form the foundation for the practice of golf architecture today. Their impressive settings and true golf values have exerted a profound influence on golf architecture to the present time and no doubt will do so forever. In the early development of the game of golf, its players, its rules, and its implements all had to adapt to fit the existing conditions of nature as found on the links. As man began laying out and building golf courses, however, the opposite soon resulted. While the avowed purpose of course designers throughout history has been to imitate nature, the actual practice of golf course architecture has demanded modification of existing terrain and soil to create conditions resembling those found on the links."<sup>1</sup> (p. 24)

Cornish and Whitten's observations in The Golf Course describe how the design of golf courses has changed from the early days of golf, when a golf course reflected its natural environment, to the present, when the existing landscape can be greatly altered. It would be wrong to say that all golf courses ruin the landscape when they move millions of cubic yards of earth; some courses enhance the land. But some courses simply do not conform with the natural setting.

#### DIFFERENT ERAS IN COURSE DEVELOPMENT

Within the past few years, the profession of golf course architecture may be evolving into a new era: the

"naturalistic" or Scottish look. I have tried to identify different eras by reading The Golf Course by Cornish and Whitten and The Game of Golf by Wethered and Wethered. The first era, being from 1414 to the mid-1700s, is characterized by primitive playing grounds and very few numbers of people playing golf within the country of Scotland.

The second era dates from the mid-1700s to around 1850. This era is characterized by widely publicized golf matches, the expanding British railway system, which made it easier for people to travel and watch such matches, and the advent of the "Gutter-Percha" golf ball. The ball which was made from the gutta-percha tree was introduced to the western world by William Montgomerie. This changed ball because the ball was less expensive, more durable, and flew farther.

The third era ranges from 1850 to 1900. This is characterized by golf's growth in other parts of the world and the introduction of golf course designers. The individual who is credited with being the first designer of a golf course is Alan Robertson. Robertson supervised the widening of fairways and the installation of the seventeenth green at St. Andrews. It was popular in this era for people to acquire services of golf course design professionals like Robertson to lay out their course. It

seemed only wise to hire people who taught or played the game professionally to layout courses since their knowledge of the game was greater than that of the average golfer.

These early golf course designers did their work entirely on the site. Most golf courses were laid out in less than a week and the procedure involved selecting natural putting green sites, routing the holes to these sites and arranging the holes into a sequence. Very little construction was undertaken since the existing contours were utilized to their fullest. Most of these course designers were also busy modifying existing courses. This was due to an increasing popularity of the game and the need for greater length required on existing courses due to the advent of the gutter-percha ball.

Despite the knowledge of these early course designers, and that most of them learned the game on the Scottish links, their work for the most part was very poor. With the increasing demand for courses inland, most courses failed to utilize the principles found on the early Scottish link courses. The greens were flat and basic in form and the fairway bunkers were rectangular, stretching at regular intervals across the course, having little architectural value. The growing of turf was very difficult on these first inland courses due to the poor



soils. Except for the courses built on natural linksland, courses of this era were built on land totally unsuitable for playing the game of golf. The combination of poor playing conditions and poor design lead Tom Simpson to say in The Game of Golf, that this was the "Dark Ages of Golf Architecture" (p. 162).

The fourth and fifth eras have approximately the same dates, but since they occurred at different locations, I will discuss each separately. The fourth era, dating from 1900 to 1914, can be termed the "Heathland" era, and its discovery represented a major step in golf course architecture. Heathlands refers to an area of well-drained, sandy soil, rolling terrain and thick vegetation located fifty miles south and west of London. The characteristics of this land are very similar to the linksland of Scotland, except for the presence of trees. The prominent golf architects that utilized the heathlands were Willie Park Jr., J.F. Abercromby, H.S. Colt and W. Herbert Fowler. These men were prominent because they recognized the true potential of the heathlands and the value of blending golf holes into the existing terrain resulting in an aesthetically pleasing landscape.

The main importance of this era is that for the first time golf architecture became a profession, rather than a sideline job for golf professionals or greenskeepers.

These early architects proved on the Heathlands that golf courses could be built away from the links as long as an analysis of the site was conducted, detailed plans were developed on the drawing board, and on-site supervision was provided once construction began. These designers also realized that aesthetics was an important aspect in the game of golf. They stayed away from geometrically shaped greens and hazards, and designed and built their courses to coexist in harmony with the site. As Simpson states in The Game of Golf, this era saw two very important improvements in two respects: almost complete elimination of the purely penal hazard and a great improvement in the artistry of landscape work.

The fifth era, dating from 1888 to 1905, is characterized by the introduction of golf in the United States. Although these early courses served the public's rising interest in golf, most were very poor designs due to amateur architects. Four courses from this era, however, stand out as influencing later courses built in the United States: Shinnecock Hills, National Golf Links, and Garden City, all on Long Island; and Myopia, north of Boston. The main reason why these courses influenced later designs is that they possessed sound design philosophies such as well routed and balanced golf holes and fair hazards.

The sixth era dating from 1905 to 1945 may be termed the "Golden Age in Golf Course Architecture in America." This is due primarily to the presence of many fine golf course architects such as Alister Mackenzie, Perry Maxwell, Donald Ross, C.B. MacDonald, Tom Simpson, George Thomas, Jr., and A.W. Tillinghast, all working in this country, and secondly to the rate at which golf courses were being built. By 1916 there were 742 courses in the United States, 1,903 by 1923, and 5,648 by 1929. Also with more technical and scientific developments in construction (the popularity of mechanical earthmoving equipment), turfgrass culture (new varieties of grass), and maintenance procedures (introduction of automatic irrigation to all parts of the golf course, increased applications of herbicides, fungicides, and insecticides, soil science, green construction) added to golfing enjoyment and playing uniformity over an entire season. Since this era, American golfers have been accustomed to highly manicured turf and a park-like appearance due to the increased emphasis on maintenance practices.

The final era in golf course architecture dates from 1945 to the present. The main characteristic in this era is the extensive amount of maintenance devoted to golf courses and in particular to maintaining the highly "manicured" appearance. With a continual increase in

knowledge of turfgrass science and maintenance/construction techniques, golfers in this country have been exposed to golf courses having such a manicured appearance. With large expanses of highly maintained turfgrass two things happen that are different from what took place during the Heathlands era. First, there is a difference in maintenance procedures, and secondly, is the loss of naturalistic qualities.

#### ADVANTAGES AND DISADVANTAGES OF NATURALISTIC COURSES

During the past ten years there has been evidence that concepts within the profession of golf course architecture may be returning to the more naturalistic or Scottish philosophy of golf course design. The naturalistic approach implies that the areas of play (tees, landing areas and greens) are well maintained and that more area of the golf course where play normally does not take place is going to possess an unkept or less manicured appearance. There are some indications that an era toward low maintenance or naturalistic golf courses is under way in America, but it is slowly developing. The main direction in the naturalistic look is not toward the true Scottish characteristics of less watering of fairways, "waist-high" rough and unraked sand traps.

Instead, it is toward an ideal that golf architects have termed the "naturalization" of golf courses. This process involves reducing maintenance to roughs and hazards, minimizing the size of the main playing areas and concentrating maintenance efforts on these smaller playing surfaces. Other characteristics originating in Scotland that will aid in naturalizing golf courses are the use of rolling fairways, contour mowing, hidden traps, blind shots, pot bunkers and sod faced bunkers.

Golf architects can recommend many low maintenance ideas, but it takes golf course superintendents to implement them and club members and owners to approve this change of philosophy in golf architecture. If the naturalization of golf courses is to be a success, changes in the public's opinion of how golf courses should look and play must also change.

According to the article, Bringing the Game Down to Earth, two manipulators of public opinion about golf courses are impact of television and the experience large numbers of golfers have had playing resort courses. If the golfing public could watch golf matches on television played on courses that promote the "natural look," then opinions of golf courses may change. In addition, more resort courses may be naturalized. People playing these courses when vacationing can bring their experience back

to their home course. According to golf course architect Robert Muir Graves, gaining public acceptance of natural courses is "going to be a long hard battle." But, as nearly every golf superintendent knows, high maintenance budgets are demanding that the "battle" be fought.

Aside from the difficulties that may occur in gaining public acceptance, I feel naturalization of golf courses must occur. By implementing the naturalistic look in golf architecture several advantages occur. The first advantage is that shot-making values may be more rewarding when a course is designed or renovated into a naturalistic design. In the article, Going Scottish, golf professional Drue Johnson of Socankety Head Golf Club in Nantucket, mentioned that a higher level of concentration and technique is required when playing a naturalistic design. This is because there are smaller playing areas and different vegetation to play from than on a typical American inland course.

The article, The Natural Look, It's The Real Thing, cites another advantage in having a naturalistic design. According to David Ames, co-developer at The Long Cove Club in Florida, "from a real estate standpoint, the views created by the varied textures of a natural golf course create a much more picturesque backdrop for those in the community than a highly manicured course. Maintenance and

operations of the course over the long term are much less." Another example of a naturalization concept in golf course design associated with real estate is the Celebrity Country Club in Tulsa, designed by Robert Trent Jones. There, Jones would like a double-row irrigation system only for fairway landing zones, with a single row system elsewhere on fairways and around greens and tees. He also would like a "quick coupler" system in roughs, which will consist of native Oklahoma grasses. (The quick-coupling valve is for connecting and disconnecting above-ground sprinklers and/or hoses.) Jones has stated that he is not concerned with the reaction of residents associated with the course, possibly because a lot of the Midwest looks yellow and tan during the summer.

The final advantage of a naturalistic golf course is the reduction of area needed to be maintained and less initial construction cost. In reducing the amount of maintained turf and leaving portions of the ground natural, a couple of advantages may occur: reduced mowing and reduced chemical applications.

With fewer applications of chemicals one thing for certain is, less maintenance cost. But the question of how chemicals applied to golf courses affect our environment is still uncertain and will be addressed only briefly.

According to Roger Rulewich, senior associate at Robert Trent Jones Inc., movement of chemicals and fertilizers through the soil are not substantial. This is because the turf is so dense that it imprisons the compounds and many of these chemicals are degradable.

Thomas Watschke, professor of turfgrass science at Penn State University, is involved in a study to find out how much, if any, runoff is produced by golf courses, lawns and sod farms. In the article, Hazards of the Game, Watschke states, "that there is in essence no problem, because the grass per unit area of a very well managed turf is so dense that the overland velocity of water that would be running off of it would be reduced to the point where nothing runs off or most of what could be contaminated water goes into the grass, thatch-soil complex and just doesn't go anywhere."

Another opinion is from Sheila Daar, executive director of Bio Integral Resource Center in Berkeley California. She states in the article, Hazards of the Game, "there is always going to be some kind of runoff. In this state alone (California) there is data showing that there has been massive groundwater pollution as a result of pesticide application to soil. Also, while some percentage of the pesticides is absorbed in the soil and biodegrades by microorganisms, a large percentage of those



pesticides move down into the lower depths of the soil into the water table, and then there is no way to get rid of it.

The threat posed of surface contamination is a definite problem. There are many bird mortalities each year traced directly to turf which has been applied with pesticides. An example of this occurred at a country club in Hewlett Harbor, New York. A flock of Brant came to feed on a fairway. Over the course of three days, 700 birds were reported dead. The cause of this was determined to be Diazinon, an insecticide commonly applied to turf. Diazinon has now been banned by the Environmental Protection Agency.

There are, however, golf courses which benefit the environment. Golf courses may provide firebreaks and are responsible for keeping thousands of acres in open land. Also, increasingly rigid regulations have actually allowed some golf courses to improve the environment. Two examples of this has just occurred at the Spanish Bay Golf Club in Monterey, California and the Old Marsh Golf Club in North Palm Beach, Florida. At Spanish Bay the site originally consisted of silicon sand dunes. The dunes had been mined in the 1920s and 1930s, and eventually nothing was left but the bedrock. For the construction of the golf course, five hundred thousand cubic yards of sand was

brought in to reconstruct the characteristics of the original dunes. Native grasses and vegetation was then used to help complete the design. Also another riparian area was restored and planted with willows and riparian vegetation.

In the state of Florida wetlands are vital for fresh water supply replenishment, flood control and irrigation are protected. The irrigation and drainage systems at the Old Marsh Golf Club in North Palm Beach, protects five separate eighteen-acre natural Everglades parcels and thirty acres of newly created marsh from fertilizer and pesticide runoff.

Other techniques used in constructing of golf courses to protect the environment consist of the use of retention ponds and earth mounding. The retention ponds may aid in storm water collection and future irrigation use. Mounding may help the protection of existing wetlands where necessary.

An example of where mounding is a critical design element is at Willowbend Golf Course in Massachusetts. Mounds exist between fairways and a cranberry bog. The mounds were planted with native grasses and no runoff occurred, which helps in the preservation of the bogs.

According to the article, The Changing Economics of Golf, new high quality golf courses are costing in the

range of 4 to 5 million dollars each. That is an average of \$225,000 to \$275,000 dollars per hole, so a golf course architect utilizing the natural conditions of a site can cut the initial cost of construction.

Another question pertaining to naturalization of golf courses is, how much maintenance cost is actually saved on more "naturalistic courses"? According to the article, Bringing The Game Down to Earth, naturalization is not a cost-cutting measure but simply a labor reallocation tool. The article further states that waste areas may not need much care, but they are often accompanied by greens with severe slopes and contours requiring hand maintenance.

Not only will maintenance concepts differ from the past but playability and aesthetics will change with the renewed interest of naturalistic type golf courses. Finding what average golfers like and dislike about naturalization of courses may aid golf course architects in the decision making process.

#### Characteristics on Maintenance of Naturalistic Golf Courses

This section pertains to the maintenance aspect of naturalistic golf courses. Superintendents of five naturalistic courses were asked about advantages and disadvantages of maintaining this style of golf course. The questions asked involved issues ranging from the

acreage of the golf course that is maintained, average green, tee and fairway size, number of gallons used yearly and yearly maintenance budget. Portions of this data is compared to course averages in their respective region. The regions were defined by the National Golf Foundation and Golf Course Superintendents Association in their biannual report, Golf Course Maintenance Report. The 1987 Golf Course Maintenance Report received 1,542 usable responses from a survey issued to superintendents throughout the United States. The questions dealt with 9-, 18- or 36-hole facilities, public or private, rounds of play yearly, course size, irrigation water, irrigation system, employee benefits, equipment inventory, golf carts, annual maintenance budget and capital expenditures. For this thesis, several of my questions to superintendents related to the Golf Course Maintenance Report criteria. These were course size (average green size, average tee size, average fairway size and maintained acres), irrigation water (quantity of water used yearly) and annual maintenance budget (total chemical and fertilizer cost and total maintenance budget).

Results gathered from naturalistic courses which are all 18-hole, private facilities, were compared to averages of golf courses of the same stature in their region. The regions as defined in the Golf Course Maintenance Report,

were based on climate, turfgrass type, facility density and cultural factors. Since there is a large variation from facility to facility the Golf Course Maintenance Report offers five categories of statistical information for most of the operational data surveyed. This is in order to represent the variations in operations data between facilities better. An example, the category of bottom 5% shows that 5% of observations fall below this figure and 95% fall above. The category median shows that 50% of observations fall below this figure and 50% above.

Finding this data from the naturalistic courses and comparing them to a regional average will support a better understanding of the advantages and disadvantages of naturalistic courses, and to see if in fact this style of course does save maintenance expenses.

Zone 6 - 2 Superintendents surveyed



Fig. 1

1. U.S. Zone 6				Naturalized Courses
	Bottom 25%	Median	Top 25%	
Maintained Acres Avg. naturalized	100	120	150	163.--45
Green size (sq.ft.) Avg. 4500		5206	6000	7000
Tee size (sq.ft.) Avg. 2000		3000	5125	4083
Fairway size (acres)	1.8	2.8	3.5	1.8

\* one course averaged 8,500 sq.ft. on each green

## 2. Quantity of Water (yearly)

### U.S. Zone 6

Bottom 5%	375,000
Bottom 25%	39,125,000
Median	72,500,000
Top 25%	101,280,000
Top 5%	775,000,000

### Naturalized Courses

80,000,000

## 3. Total Chemical and Fertilizer Cost (yearly)

### U.S. Zone 6

Bottom 5%	\$ 3,830
Bottom 25%	18,700
Median	31,750
Top 25%	44,150
Top 5%	74,331

### Naturalized Courses

\$29,000

4. Total Maintenance Budget (yearly)

U.S. Zone 6

Bottom 5%	\$ 90,968
Bottom 25%	227,412
Median	305,598
Top 25%	407,572
Top 5%	702,350

Naturalized Courses

\$407,500

5. How much, if any money is saved on your course with the naturalized areas?
- Average of both courses: \$25,000
6. Do you use any maintenance practices on the naturalized areas?
- mowing once a year
  - yearly burning
  - selective areas of herbicide use next to maintained rough
  - total irrigation due to spacing of heads (only one of the courses)
7. What are the advantages/disadvantages of maintaining a naturalistic course compared to the more traditional American style of golf course?
- less maintenance cost
  - aesthetics (visual contrast)
  - no tree maintenance (spraying, pruning, planting, leaf clean up)
8. Do you have different or more varieties of weeds to contend with and is there an increase in pests? (moles, skunks, insects, deer, etc.)
- when there is a mixture of grass and forbes for example, it is more difficult to maintain than when there is a straight mixture of grass varieties
  - must compromise when the natural area is closer to play

- some homeowners disapprove the natural look, must clear a 20' buffer along property line
9. What is your staff's opinion concerning maintenance practices on a naturalistic course?
- did not express an opinion
10. Would you rather be a superintendent on a more traditional style of golf course or a naturalistic golf course?
- both responded natural

Zone 7 - 3 Superintendents surveyed



Fig. 2

(Golf Course Maintenance Report: 1987)

1. U.S. Zone 7			Naturalized Courses	
	Bottom 25%	Median	Top 25%	
Maintained Acres Avg. naturalized	108	123	150	142.--40
Green size (sq.ft.) Avg. 5000		5500	6030	*6930
Tee size (sq.ft.) Avg. 2625		4000	5950	3447



Fairway size (acres)	1.9	2.5	4.0	2.19
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\*one course averaged 10,000 sq.ft. on each green

## 2. Quantity of Water (yearly)

### U.S. Zone 7

Bottom 5%	1,080,000
Bottom 25%	27,000,000
Median	65,000,000
Top 25%	37,000,000
Top 5%	324,000,000

### Naturalized Courses

66,500,000

## 3. Total Chemical and Fertilizer Cost (yearly)

### U.S. Zone 7

Bottom 5%	\$ 4,500
Bottom 25%	8,200
Median	13,383
Top 25%	25,987
Top 5%	50,725

### Naturalized Courses

\$ 9,933

## 4. Total Maintenance Budget (yearly)

### U.S. Zone 7

Bottom 5%	\$ 83,788
Bottom 25%	146,759
Median	194,619
Top 25%	271,250
Top 5%	456,193

### Naturalized Courses

\$257,333

5. How much, if any money is saved on your course with the naturalized areas?
  - Average of both courses: \$25,866
6. Do you use any maintenance practices on the naturalized areas?
  - occasional mowing adjacent to maintained areas
  - limited irrigation
  - limited herbicide use adjacent to maintained areas
  - one course applies absolutely no irrigation and fertilizer to the naturalized area
7. What are the advantages/disadvantages of maintaining a naturalistic course compared to the more traditional American style of golf course?
  - less maintenance cost
  - less water, fertilizer, labor and mowing
  - imitation of the Scots
  - dramatic contrast
8. Do you have different or more varieties of weeds to contend with and is there an increase in pests? (moles, skunks, insects, deer, etc.)
  - slightly more foxtail, sandbur, bundle, thistle
9. What is your staff's opinion concerning maintenance practices on a naturalistic course?
  - enjoy
  - proud
10. Would you rather be a superintendent on a more traditional style of golf course or a naturalistic golf course?
  - all three responded natural
  - more problem on U.S. style of course
  - naturalistic courses are prettier and they add to golf

## Chapter Three

### METHODOLOGY

A survey questionnaire was used as the means to accomplish the previously stated research objectives. This allowed a much larger sample response to be collected in a shorter period of time. The survey questionnaire was conducive to targeting a particular sample population, the average golfer.

The main hypothesis in this study is based on the sample of people surveyed, their attitudes toward naturalistic type golf courses are different than the guiding design principles golf course architects have used on this type of course. The study addresses two central questions: 1) Does the average golfer prefer to play the naturalistic style or the more traditional American, highly manicured style of golf course? and 2) What does the average golfer like and/or dislike about naturalistic golf courses?

#### Data Collection and Analysis

The questionnaire consisted of questions pertaining to the aesthetics and playability of naturalistic golf courses, with four questions being directed towards aesthetics and eleven for playability and demographics.

A cover letter was first sent to the head golf professional of each country club to be surveyed. This was followed up by a telephone call, confirming a day to come to the golf course. While at each golf course, I situated myself between the 18th green and the clubhouse to hand the questionnaire to golfers as they came off the course.

The data was tabulated and entered into the SAS (Statistical Analysis System) in the Statistics Department at Kansas State University. The information was sent to the main frame computer of KSU and categorized in tables. The tables analyzed each response together with the written and verbal responses.

The country clubs that were selected for the analysis were Southwind Country Club in Garden City, Kansas, Tall Grass Country Club in Wichita, Kansas, and Prairie Dunes Country Club in Hutchinson, Kansas. These courses were selected because of their naturalistic characteristics.

## Chapter Four

### RESULTS

During the survey, 108 participants from three country clubs responded to 15 questions. Analyzing the many combinations of data sets has generated a great deal of information. All 15 questions on the questionnaire were first analyzed according to how each question was answered. Additional correlations were analyzed according to age, handicap, years played, sex, and course played. All tables will be shown for each correlation with additional comments for questions showing significant differences as indicated by the Chi-Square test.

The Chi-Square test was used in the analysis of the data in order to assist in determining which tables of data had significant differences between various categories considered. The tables which had a p-value for the Chi-Square statistic of 0.05 or less will be considered as having significant differences.

The information in this chapter has been organized into 5 general categories: general profile of sample and the four demographic responses compared to each question.

#### Profile of Sample Population

The following results consist of demographic information gathered from the survey and provide some insight to the composition of the survey sample

population. The following tables contain information pertaining to demographics and courses played.

	Group	Amount of Response	Percent
1.	<u>Age</u>		
	1 & 2 (18-40)	42	39.3
	3 (41-50)	30	28.0
	4 & 5 (51 & over)	35	32.7
		<u>107</u>	
2.	<u>Years Played</u>		
	10 & under	33	31.7
	11 - 20	39	37.5
	21 - 55	32	30.8
		<u>104</u>	
3.	<u>Handicap</u>		
	0 - 10	30	28.8
	11 - 20	58	55.8
	21 - 30	16	15.4
		<u>104</u>	
4.	<u>Gender</u>		
	Male	89	84.0
	Female	16	16.0
		<u>106</u>	
5.	<u>Course</u>		
	Prairie Dunes	30	27.8
	Southwind	30	27.8
	Tallgrass	48	44.4
		<u>108</u>	

## RESULTS

The following tables show how golfers answered each question compared to their age, years played, handicap, gender, and course. For age, years played and handicap, each were broken down into three categories. For age the categories of 18 to 29 and 30 to 40 years of age were combined for a total of 43 participants. Category of 41 to 50 years of age is kept the same for a total of 30 participants. The final group combined age groups of 51 to 65 and 65 and over, for a total of 35 participants. The category of years played is also broken into three categories. The first group is 2 to 10 years for a total of 37 participants, 12 to 20 years for a total of 39 participants is the second and the third is 21 to 55 years for a total of 32 participants. The category of handicap is broken very similar to years played. Handicaps of 0 to 10 for a total of 34 participants is the first group. Next is handicaps of 11 to 20 for a total of 58 participants. The final group has handicaps of 21 to 31 for a total of 16 participants. The reason for this grouping is to simplify the analysis process between each group and categories.

No further observations or explanations are given unless there is significant or nearly significant

differences between the groups for each table. The differences again are found by the Chi-Square value.

### Aesthetics

Question 1: How strongly do you feel a naturalistic course relates or blends in with the surrounding environment?

	Aes.1	Freq.	Perc.	Cum. Freq.	Cum. Perc.
strongly disagree	1				
	2				
	3	2	1.9	2	1.9
neutral	4	8	7.4	10	9.3
	5	27	25.0	37	34.3
	6	46	42.6	83	76.9
strongly agree	7	25	23.1	108	100.0

Most participants felt fairly to very strong that naturalistic courses do relate with the surrounding environment. This question is straightforward but it does suggest that golfers feel that naturalistic courses do work with the surrounding environment.

Question 2: Is it important to utilize to a much greater extent the existing natural landscape character in golf course design than the more traditional, manicured American golf course?

	Aes. 2	Freq.	Perc.	Cum. Freq.	Cum. Perc.
strongly disagree	1	1	0.9	1	0.9
	2	1	0.9	2	1.9
	3	4	3.7	6	5.6
neutral	4	15	13.9	21	19.4
	5	32	29.6	53	49.1
	6	40	37.0	93	86.1
strongly agree	7	15	13.9	108	100.0



Most participants felt fairly to very strong that golf courses should use the existing natural landscape character. A total of 80.5% answered 5, 6 or 7, which strongly suggests that golfers would prefer playing a course which blends in with the surrounding environment.

Question 3: Do you feel a golf hole can be defined by prairie grass, wild flowers, dunes and/or mounds?

	Aes. 3	Freq.	Cum. Perc.	Cum. Freq.	Perc.
strongly disagree	1				
	2	1	0.9	1	0.9
	3	6	5.6	7	6.5
neutral	4	16	14.8	23	21.3
	5	36	33.3	59	54.6
	6	34	31.5	93	86.1
strongly agree	7	15	13.9	108	100.0

On most golf courses in the United States a common practice is to plant a few trees behind a green and on sides of fairways. This helps "set" the hole, enabling the golfer to have better depth perception. But on a site with few trees present, other techniques may be used. For question 3, 78.7% of the participants felt strongly that using prairie grasses, wildflowers, dunes and/or mounds can define a hole. By using the latter techniques a golf course can mature faster instead of waiting for trees to reach full size.

Question 4: If you had a choice, which would you rather play, a course which has a more naturalistic quality or a course having the quality of a more manicured and maintained course?

	Aes. 4	Freq.	Cum. Perc.	Cum. Freq.	Perc.
naturalistic	1	73	67.6	73	67.6
manicured	2	29	26.9	102	94.4
neutral	3	6	5.6	108	100.0

For this question 67.6% of the participants would rather play a more naturalistic course. From this figure it shows the more a person plays the naturalistic style of course the more they enjoy it and would rather play it.

### Playability

Question 1: Do you feel there is more variety in a naturalistic course as opposed to the more traditional highly manicured course?  
(variety -- different types of lies, visual appearance, types of shots required)

	Play. 1	Freq.	Perc.	Cum. Freq.	Cum. Perc.
strongly disagree	1				
	2	1	0.9	1	0.9
	3	9	8.3	10	9.3
neutral	4	19	17.6	29	26.9
	5	26	24.1	55	50.9
	6	38	35.2	93	86.1
strongly agree	7	15	13.9	108	100.0

On a naturalistic style of course, there are more different types of grasses in the roughs than on the more traditional American style of course. For this question, 73.2% of the participants felt favorably that naturalistic courses add variety due to different types of shots required from the rough and variety in the visual appearance.

Question 2: Do you feel that better shot values are used when you play on a naturalistic golf course?  
(shot values -- how fairly a course rewards power, finesse, and accuracy)

	Play. 2	Freq.	Perc.	Cum. Freq.	Cum. Perc.
strongly disagree	1				
	2	3	2.8	3	2.8
	3	9	8.3	12	11.1
neutral	4	24	22.2	36	33.3
	5	28	25.9	64	59.3
	6	23	21.3	87	80.6
strongly agree	7	21	19.4	108	100.0

In comparing shot values of naturalistic courses to the more traditional American course 22.2% of the participants felt there was no difference in the two types of courses. When combining answers 5, 6 & 7, 66.6% felt strongly that a naturalistic course rewards power, finesse and accuracy.

Question 3: You do feel a golfer plans a shot better on a naturalistic course?

	Play. 3	Freq.	Perc.	Cum. Freq.	Cum. Perc.
strongly disagree	1				
	2	2	1.9	2	1.9
	3	6	5.6	8	7.4
neutral	4	36	33.3	44	40.7
	5	19	17.6	63	58.3
	6	32	29.6	95	88.0
strongly agree	7	13	12.0	108	100.0

33.3% of the participants felt that a golfer plans a shot the same on either style of course. But when combining answers 5, 6 & 7, 59.2% felt that a golfer must plan a shot more on a naturalistic course. This may be due to different types of rough, more trouble to get into or more variables to take into account such as different types of lies and stances.

Question 4: Do you feel the playability on a naturalistic course exceeds that of the highly manicured course? (playability -- how playable the course is to all levels of golfers)

	Play.4	Freq.	Perc.	Cum. Freq.	Cum. Perc.
strongly disagree	1				
	2	14	13.0	14	13.0
	3	33	30.6	47	43.5
neutral	4	31	28.7	78	72.2
	5	10	9.3	88	81.5
	6	14	13.0	102	94.4
strongly agree	7	6	5.6	108	100.0

In comparing playability of naturalistic courses to the more traditional American courses 28.7% of the participants felt there was no difference in the two types of courses. When combining answers 1, 2 & 3, 43.6% of the participants did not feel the playability on a naturalistic is as good as the more traditional American style of golf course. This suggests that the natural areas on these courses come into play too much and that the grass is too tall and thick for the average golfer to play out of. Other factors that may make a naturalistic course not as playable is rolling fairways that provide different types of stances and deep sand bunkers that are difficult to play out of which is a characteristic of naturalistic courses.

Question 5: Do you feel your overall golf game is better when you regularly play on a naturalistic course?

	Play.5	Freq.	Perc.	Cum. Freq.	Cum. Perc.
strongly disagree	1				
	2	4	3.7	4	3.7
	3	14	13.0	18	16.7
neutral	4	34	31.5	18	16.7
	5	17	15.7	52	48.1
	6	26	24.1	69	63.9
strongly agree	7	13	12.0	108	100.0

When combining the more agreeable responses of 5, 6 & 7, golfers felt their overall golfer game is better when played on a naturalistic golf course. Although 31.5% felt neutral, a total of 51.8% answered 5, 6 or 7 compared to only 16.7% answering 1, 2 & 3 or nonagreeable. I feel the reason golfers feel favorable to this question is that more types of shots are called for from different lies and stances.

Question 6: Do you feel rolling fairways provide more variety of shots, as compared to flat fairways? (rolling fairways -- mounds, knolls, bumps, 6" to 6' in height)

	Play. 6	Freq.	Perc.	Cum. Freq.	Cum. Perc.
strongly disagree	1	2	1.9	2	1.9
	2	1	0.9	3	2.8
	3	3	2.8	6	5.6
neutral	4	5	4.6	11	10.2
	5	23	21.3	34	31.5
	6	52	48.1	86	79.6
strongly agree	7	22	20.4	108	100.0

One of the characteristic of courses in Great Britain is rolling fairways, as compared to a typical American style of golf course with most fairways being relatively flat. The responses I gathered from this question, the participants felt that rolling fairways added variety to a round of golf. A total of 89.8% felt agreeable answering 5, 6 or 7 compared to only 10.2% feeling neutral or less agreeable.

Question 7: What is the maximum depth a greenside sand bunker should have?

Play. 7	Freq.	Perc.	Cum. Freq.	Cum. Perc.
1 (1'-2')	4	3.7	4	3.7
2 (3'-4')	33	30.6	37	34.3
3 (5'-6')	53	49.1	90	83.3
4 (7'-8')	12	11.1	102	94.4
5 (>8')	6	5.6	108	100.0

One of the characteristics of courses in Great Britain is the use of pot bunkers. A pot bunker is usually deeper than the usual sand bunker, and is smaller in diameter. In recent years the use of pot bunkers has been growing in the United States especially on naturalistic style golf courses. In asking golfers what the maximum depth a greenside sand bunker should be, 49.1% answered 5'-6', 30.6% answered 3'-4', 11.1% answered 7'-8', 5.6% answered 7'-8', and only 3.7% felt 1'-2' should be the maximum depth.

Question 8: What is the maximum depth a fairway bunker should have? (approximately 150 to 180 yards from the green)

Play. 8	Freq.	Perc.	Cum. Freq.	Cum. Perc.
1 (1'-2')	27	25.0	27	25.0
2 (3'-4')	54	50.0	81	75.0
3 (5'-6')	24	22.2	105	97.2
4 (7'-8')	3	2.8	108	100.0
5 (>8')	0	0	0	0

This question was asked to see if golfers felt there should be differences in depths of greenside bunkers as compared to fairway bunkers, and if so, how much?

The depth of fairway bunkers, 150 to 180 yards from the green, 50.0% of the golfers felt 3'-4' should be the maximum depth. On greenside bunkers, 5'-6' was the maximum depth. The remaining responses for fairway bunkers, 25.0% answered 1'-2', 22.2% answered 5'-6', 2.8% answered 7'-8' and 0.0% answered greater than 8'.

Question 9: On a short par 4, how far do you feel an unmanicured area should be from the fairway (length of hole -- 300 to 370 yards).

Play. 9	Freq.	Perc.	Cum. Freq.	Cum. Perc.
1 (0-5 yds)	13	12.1	13	12.1
2 (6-15 yds)	54	50.5	67	62.6
3 (15-50 yds)	33	30.8	100	93.5
4 (> 50 yds)	7	6.5	107	100.0

Note: one no response

This question and the next were asked to see if golfers felt there should be any difference how far unmanicured areas should be from fairways on a par 4 hole of different lengths. For this question 50.5% of the participants felt the unmanicured area should be 6-15 yards off the fairway on a short par 4. The remaining responses were 30.8% answered 15-50 yds., 12.1% answered 0-5 yds. and 6.5% answered greater than 50 yds.

Question 10: On a long par 4, how far do you feel an unmanicured area should be from the fairway? (length of hole 430 to 460 yards)

Play. 10	Freq.	Perc.	Cum. Freq.	Cum. Perc.
1 (0-5 yds)	9	8.4	9	8.4
2 (6-15 yds)	28	26.2	37	34.6
3 (15-50 yds)	59	55.1	96	89.7
4 (> 50 yds)	11	10.3	107	100.0

Note: one no response

As expected, participants felt the longer a par 4 the further the unmanicured area should be off the fairway. On a longer par 4 of 430 to 460 yards, 55.1% of the golfers felt the unmanicured area should be 15-50 yards off the fairway. The remaining responses were 26.2% answered 6-15 yds., 10.3% answered greater than 50 yds., and 8.4% answered 0-5 yds.

Question 11: How far should an unmanicured area be from the green?

Play. 11	Freq.	Perc.	Cum. Freq.	Cum. Perc.
1 (0-3 yds)	4	3.7	4	3.7
2 (4-10 yds)	43	40.2	47	43.9
3 (11-15 yds)	43	40.2	90	84.1
4 (16-25 yds)	16	15.0	106	99.1
5 (> 25 yds)	1	0.9	107	100.0

Note: one no response

This question is to see how far golfers feel an unmanicured area should be from the green. 4-10 yards and 11-15 yards were both answered 40.2%. The remaining responses were 15.0% answered 16-25 yards, 3.4% answered 0-3 yards, and 0.9% answered greater than 25 yards.

Question 1 How strongly do you feel a naturalistic course relates or blends in with the surrounding environment?

<u>Age</u>		(18-40)	(41-50)	(51 & over)	
		1	2	3	
strongly disagree	1	0	0	0	
	2	0	0	0	
	3	2	0	0	
neutral	4	3	2	3	
	5	10	9	8	
	6	19	13	14	
strongly agree	7	9	6	10	
		<hr/>	<hr/>	<hr/>	
		43	30	35	108



Years Played

		(2-10) 1	(12-20) 2	(21-55) 3	
strongly disagree	1	0	0	0	
	2	0	0	0	
	3	1	1	0	
neutral	4	3	4	1	
	5	12	10	5	
	6	12	18	16	
strongly agree	7	9	6	10	
		<hr/>	<hr/>	<hr/>	
		37	39	32	108

Handicap

		(0-10) 1	(11-20) 2	(21-31) 3	
strongly disagree	1	0	0	0	
	2	0	0	0	
	3	0	0	2	
neutral	4	2	4	2	
	5	8	14	5	
	6	14	28	4	
strongly agree	7	10	12	3	
		<hr/>	<hr/>	<hr/>	
		34	58	16	108

Sex

		(M) 1	(F) 2	
strongly disagree	1	0	0	
	2	0	0	
	3	2	0	
neutral	4	7	1	
	5	22	5	
	6	37	8	
strongly agree	7	21	3	
		<hr/>	<hr/>	
		89	17	106

Course

		Prairie Dunes	Southwind	Tallgrass	
strongly disagree	1	6	0	0	
	2	0	0	0	
	3	1	0	1	
neutral	4	2	5	1	
	5	8	8	11	
	6	10	12	24	
strongly agree	7	9	5	11	
		<hr/>	<hr/>	<hr/>	
		30	30	48	108

Observations: For each group most responses answers 5, 6 or 7. Thus, most participants felt fairly to very strong about how naturalistic courses relate with the surrounding environment.

Each group felt nearly the same for each demographic category.

Question 2: Is it important to utilize to a much greater extent the existing natural landscape character in golf course design than the more traditional, manicured American golf course?

Age

		(18-40) 1	(41-50) 2	(51 & over) 3	
strongly disagree	1	1	0	0	
	2	1	0	0	
	3	2	1	1	
neutral	4	8	2	5	
	5	10	13	9	
	6	16	12	12	
strongly agree	7	5	2	8	
		<hr/>	<hr/>	<hr/>	
		43	30	35	108

Years Played

		(2-10)	(12-20)	(21-55)	
		1	2	3	
strongly disagree	1	1	0	0	
	2	1	0	0	
	3	1	2	1	
neutral	4	66	5	4	
	5	11	15	6	
	6	10	15	15	
strongly agree	7	7	2	6	
		37	39	32	108

Handicap

		(0-10)	(11-20)	(21-31)	
		1	2	3	
strongly disagree	1	0	1	0	
	2	0	1	0	
	3	0	3	1	
neutral	4	6	6	3	
	5	9	17	6	
	6	11	24	5	
strongly agree	7	8	6	1	
		34	58	16	108

Sex

		(M)	(F)	
		1	2	
strongly disagree	1	1	0	
	2	1	0	
	3	4	0	
neutral	4	12	2	
	5	26	6	
	6	30	9	
strongly agree	7	15	0	
		89	17	108

Course

		Prairie Dunes	Southwind	Tallgrass	
strongly disagree	1	0	0	1	
	2	0	0	1	
	3	2	1	1	
neutral	4	3	7	5	
	5	9	8	15	
	6	11	12	17	
strongly agree	7	5	2	8	
		<hr/>	<hr/>	<hr/>	
		30	30	48	108

Observations: For each group most responses answered 4 (neutral) on up to 7 (very strong). Thus most participants felt fairly strong to very strong about how future golf courses should utilize to a greater extent the natural landscape character.

Each group felt nearly the same for each demographic category.

Question 3: Do you feel a golf hole can be defined by prairie grass, wild flowers, dunes and/or mounds?

Age

		(18-40) 1	(41-50) 2	(51 & over) 3	
strongly disagree	1	0	0	0	
	2	1	0	0	
	3	4	1	1	
neutral	4	8	3	5	
	5	13	12	11	
	6	11	9	14	
strongly agree	7	6	5	4	
		<hr/>	<hr/>	<hr/>	
		43	30	35	108

Years Played

		(1-20)	(12-20)	(21-55)	
		1	2	3	
strongly disagree	1	0	0	0	
	2	1	0	0	
	3	3	3	0	
neutral	4	7	6	3	
	5	10	14	12	
	6	11	11	12	
strongly agree	7	5	5	5	
		37	39	32	108

Handicap

		(0-10)	(11-20)	(21-31)	
		1	2	3	
strongly disagree	1	0	0	0	
	2	1	0	0	
	3	0	3	3	
neutral	4	4	9	3	
	5	15	15	6	
	6	6	24	4	
strongly agree	7	8	7	0	
		34	58	16	108

Sex

		(M)	(F)	
		1	2	
strongly disagree	1	0	0	
	2	1	0	
	3	6	0	
neutral	4	14	1	
	5	31	4	
	6	23	11	
strongly agree	7	14	1	
		89	17	108

Course

		Prairie Dunes	Southwind	Tallgrass	
strongly disagree	1	0	0	0	
	2	0	0	1	
	3	2	2	2	
neutral	4	2	5	9	
	5	12	5	19	
	6	8	11	15	
strongly agree	7	6	7	2	
		30	30	48	108

Observations: There is a significant difference the participants responded according to their handicap. Combining answers 6 & 7 together, this is how they responded:

41% ... 10 or less handicap  
 53% ... 11 to 20 handicap  
 25% ... > 20 handicap

It seems golfers with a higher handicap feel neutral about the ability of prairie grass, wild flowers, dunes and/or mounds defining a hole. So on a type of golf course that will have more higher handicap golfers (i.e., public municipal and possibly resort) the practice of planting trees behind and to the sides of greens is the best technique to define a hole.

Question 4: If you had a choice, which would you rather play, a course which has a more naturalistic quality or a course having the quality of a more manicured and maintained course?

Age

		(18-40) 1	(41-50) 2	(51 & over) 3	
naturalistic	1	25	19	29	
no opinion	3	1	4	1	
American	5	17	7	5	
		43	30	35	108

Years Played

		(2-10) 1	(12-20) 2	(21-55) 3	
naturalistic	1	23	24	26	
no opinion	3	1	4	1	
American	5	13	11	5	
		<hr/>	<hr/>	<hr/>	
		37	39	32	108

Handicap

		(0-10) 1	(11-20) 2	(21-31) 3	
naturalistic	1	21	42	10	
no opinion	3	3	3	0	
American	5	10	13	6	
		<hr/>	<hr/>	<hr/>	
		34	58	16	108

Sex

		(M) 1	(F) 2	
naturalistic	1	57	15	
no opinion	3	6	0	
American	5	16	2	
		<hr/>	<hr/>	
		89	17	106

Course

		Prairie Dunes	Southwind	Tallgrass	
naturalistic	1	22	20	31	
no opinion	3	2	2	2	
American	5	6	8	15	
		<hr/>	<hr/>	<hr/>	
		30	30	48	108

Observations: The participants answered this question similarly except for the category of age. The percentages are those who preferred to play a naturalistic style of course.

58% ... group 1 (18 to 40)  
 63% ... group 2 (41 to 50)  
 82% ... group 3 (51 & over)

From this analysis, the older a golfer is the more they would prefer to play a more naturalistic style of golf course. This may be because older golfers are not concerned about their score or how many golf balls they lost in the taller prairie grass.

Overall, in each group the participants would rather play the more naturalistic style of golf course. I would assume that once a person plays a naturalistic course the more they enjoy the game.

Question 5: Do you feel there is more variety in a naturalistic course as opposed to the more traditionally highly manicured course? (variety -- different types of lies, visual appearance, types of shots required)

<u>Age</u>		(18-40)	(41-50)	(51 & over)	
		1	2	3	
strongly disagree	1	0	0		
	2	1	0	0	
	3	7	2	0	
neutral	4	8	4	7	
	5	11	7	8	
	6	11	13	14	
strongly agree	7	5	4	6	
		<hr/>	<hr/>	<hr/>	
		43	30	35	108



Years Played

		(2-10)	(12-20)	(21-55)
		1	2	3
strongly disagree	1	0	0	0
	2	1	0	0
	3	3	5	1
neutral	4	10	4	5
	5	5	12	9
	6	11	12	15
strongly agree	7	7	6	2
		37	39	32

108

Handicap

		(0-10)	(11-20)	(21-31)
		1	2	3
strongly disagree	1	0	0	0
	2	1	0	0
	3	2	4	3
neutral	4	7	10	2
	5	8	14	4
	6	11	22	5
strongly agree	7	5	8	2
		34	58	16

108

Sex

		(M)	(F)
		1	2
strongly disagree	1	0	0
	2	1	0
	3	9	0
neutral	4	17	1
	5	22	4
	6	29	8
strongly agree	7	11	4
		89	17

108

Course

		Prairie Dunes	Southwind	Tallgrass	
strongly disagree	1	0	0	0	
	2	0	0	1	
	3	2	3	4	
neutral	4	0	12	7	
	5	11	4	11	
	6	11	7	20	
strongly agree	7	6	4	5	
		<hr/>	<hr/>	<hr/>	
		30	30	48	108

Observations: Most participants answered 5 or 6 (fairly strong), that naturalistic courses do add more variety than the more traditional American style of golf course. I feel golfers answered this way because of variety of grasses and different types of lies due to the variety of grasses and fairway mounding.

Question 6: Do you feel that better shot values are used when you play on a naturalistic golf course? (shot values -- how fairly a course rewards power, finesse, and accuracy)

Age

		(18-40) 1	(41-50) 2	(51 & over) 3	
strongly disagree	1	0	0	0	
	2	3	0	0	
	3	6	1	2	
neutral	4	11	10	3	
	5	13	4	11	
	6	3	10	10	
strongly agree	7	7	5	9	
		<hr/>	<hr/>	<hr/>	
		43	30	35	108

Years Played

		(2-10)	(12-20)	(21-55)	
		1	2	3	
strongly disagree	1	0	0	0	
	2	1	2	0	
	3	4	5	0	
neutral	4	8	7	9	
	5	9	12	7	
	6	10	3	10	
strongly agree	7	5	10	6	
		37	39	32	108

Handicap

		(0-10)	(11-20)	(21-31)	
		1	2	3	
strongly disagree	1	0	0	0	
	2	2	0	1	
	3	3	4	2	
neutral	4	8	14	2	
	5	9	16	3	
	6	3	14	6	
strongly agree	7	9	10	2	
		34	58	16	108

Sex

		(M)	(F)	
		1	2	
strongly disagree	1	0	0	
	2	3	0	
	3	8	0	
neutral	4	22	2	
	5	25	2	
	6	15	8	
strongly agree	7	16	5	
		89	17	106

Course

		Prairie Dunes	Southwind	Tallgrass	
strongly disagree	1	0	0	0	
	2	0	0	3	
	3	1	4	4	
neutral	4	6	11	7	
	5	7	6	15	
	6	8	6	9	
strongly agree	7	8	3	10	
		<hr/>	<hr/>	<hr/>	
		30	30	48	108

Observations: There is significant differences in the category of Age. The percentages are as follows:

Answers 3 & 4	Group 1 (18 to 40)	40%
	Group 2 (41 to 50)	36%
	Group 3 (51 & over)	14%
Answers 5 & 6	Group 1 (18 to 40)	37%
	Group 2 (41 to 50)	46%
	Group 3 (51 & over)	60%

Question 7: Do you feel a golfer plans a shot better on a naturalistic course?

Age

		(18-40) 1	(41-50) 2	(51 & over) 3	
strongly disagree	1	0	0	0	
	2	2	0	0	
	3	5	1	0	
neutral	4	17	9	10	
	5	8	3	8	
	6	6	14	12	
strongly agree	7	5	3	5	
		<hr/>	<hr/>	<hr/>	
		43	30	35	108

<u>Years Played</u>		(2-10)	(12-20)	(21-55)	
		1	2	3	
strongly disagree	1	0	0	0	
	2	1	1	0	
	3	4	1	1	
neutral	4	9	13	14	
	5	2	10	7	
	6	14	10	8	
strongly agree	7	7	4	2	
		37	39	32	108

<u>Handicap</u>		(0-10)	(11-20)	(21-31)	
		1	2	3	
strongly disagree	1	0	0	0	
	2	1	0	1	
	3	1	3	2	
neutral	4	16	17	3	
	5	5	12	2	
	6	6	21	5	
strongly agree	7	5	5	3	
		34	58	16	108

<u>Sex</u>		(M)	(F)	
		1	2	
strongly disagree	1	0	0	
	2	2	0	
	3	6	0	
neutral	4	33	2	
	5	18	1	
	6	21	10	
strongly agree	7	9	4	
		89	17	108

Course

		Prairie Dunes	Southwind	Tallgrass	
strongly disagree	1	0	0	0	
	2	0	0	2	
	3	1	3	2	
neutral	4	6	15	15	
	5	7	6	6	
	6	11	4	17	
strongly agree	7	5	2	6	
		30	30	48	108

Observations: Most participants answered neutral, although the remaining responses felt slightly to strongly agreeing that a golfer plans a shot better on a naturalistic course. This may be because most golfers are not used to this style of course or the native grasses and steep faces on bunkers which are characteristics of naturalistic courses are strenuous hazards to recover from.

There is a significant difference in responses in the category of Sex. The ladies category strongly agreed while most men felt rather neutral. 88% of the ladies answered 5, 6 or 7 while 54% of the males answered the same. The differences may be because most ladies will have a harder time recovering from a deep pot bunker or native grass due to their strength.

Question 8: Do you feel the playability on a naturalistic course exceeds that of the highly manicured course? (playability -- how playable the course is to all levels of golfers)

<u>Age</u>		(18-40)	(41-50)	(51 & over)	
		1	2	3	
strongly disagree	1	0	0	0	
	2	6	4	4	
	3	15	10	8	
neutral	4	12	8	11	
	5	2	3	5	
	6	6	4	4	
strongly agree	7	2	1	3	
		43	30	35	108

<u>Years Played</u>		(2-10)	(12-20)	(21-55)	
		1	2	3	
strongly disagree	1	0	0	0	
	2	4	6	4	
	3	10	12	11	
neutral	4	11	13	7	
	5	3	2	5	
	6	6	5	3	
strongly agree	7	3	1	2	
		37	39	32	108

<u>Handicap</u>		(0-10)	(11-20)	(21-31)	
		1	2	3	
strongly disagree	1	0	0	0	
	2	6	8	0	
	3	10	17	6	
neutral	4	9	19	3	
	5	4	4	2	
	6	2	9	3	
strongly agree	7	3	1	2	
		34	58	16	108

Sex

		(M)	(F)	
		1	2	
strongly disagree	1	0	0	
	2	11	3	
	3	26	5	
neutral	4	25	6	
	5	10	0	
	6	13	1	
strongly agree	7	4	2	
		<hr/>	<hr/>	
		89	17	106

Course

		Prairie			
		Dunes	Southwind	Tallgrass	
strongly disagree	1	0	0	0	
	2	3	6	5	
	3	8	10	15	
neutral	4	14	6	11	
	5	2	2	6	
	6	1	5	8	
strongly agree	7	2	1	3	
		<hr/>	<hr/>	<hr/>	
		30	30	48	108

Observations: Most participants felt playability was better on highly manicured courses. All categories were answered nearly the same with most responses ranging from 2 to 4. The reasoning for these responses I feel are because some bunkering may be to deep and native grasses ranging in height of 6" to 3' tall are not far enough out of play.

Question 9: Do you feel your overall golf game is better when you regularly play on a naturalistic course?



<u>Age</u>		(18-40)	(41-50)	(51 & over)	
		1	2	3	
strongly disagree	1	0	0	0	
	2	2	0	2	
	3	9	1	4	
neutral	4	12	12	10	
	5	5	6	6	
	6	10	7	9	
strongly agree	7	5	4	4	
		43	30	35	108

<u>Yards Played</u>		(2-10)	(12-20)	(21-55)	
		1	2	3	
strongly disagree	1	0	0	0	
	2	2	1	1	
	3	5	4	5	
neutral	4	8	17	9	
	5	6	4	7	
	6	10	8	8	
strongly agree	7	6	5	2	
		37	38	32	108

<u>Handicap</u>		(0-10)	(11-20)	(21-31)	
		1	2	3	
strongly disagree	1	0	0	0	
	2	2	1	1	
	3	7	5	2	
neutral	4	9	19	6	
	5	4	10	3	
	6	7	16	3	
strongly agree	7	5	7	1	
		34	58	16	108

Sex

		(M)	(F)	
		1	2	
strongly disagree	1	0	0	
	2	4	0	
	3	13	0	
neutral	4	25	9	
	5	17	0	
	6	21	4	
strongly agree	7	9	4	
		89	14	106

Course

		Prairie Dunes	Southwind	Tallgrass	
strongly disagree	1	0	0	0	
	2	1	0	3	
	3	3	6	5	
neutral	4	11	9	14	
	5	4	3	10	
	6	7	8	11	
strongly agree	7	4	5	5	
		30	30	48	108

Observations: Most single responses were neutral pertaining to the golfers' overall game. But over half of the participants answered 5, 6 and 7 (fair to strongly agree). I believe golfers feel this way because more shots are required from varied stances, different lies, and different types of bunkers.

Question 10: Do you feel rolling fairways provide more variety of shots, as compared to flat fairways? (rolling fairways -- mounds, knolls, bumps, 6" to 6' in height)

<u>Age</u>		(18-40)	(41-50)	(51 & over)	
		1	2	3	
strongly disagree	1	2	0	0	108
	2	0	0	1	
	3	3	0	0	
neutral	4	2	2	1	
	5	12	7	4	
	6	16	16	20	
strongly agree	7	8	5	9	
		<hr/>	<hr/>	<hr/>	
		43	30	35	

<u>Years Played</u>		(2-10)	(12-20)	(21-55)	
		1	2	3	
strongly disagree	1	1	1	0	108
	2	0	0	1	
	3	1	1	1	
neutral	4	1	2	2	
	5	4	15	4	
	6	22	13	17	
strongly agree	7	8	7	7	
		<hr/>	<hr/>	<hr/>	
		37	39	32	

<u>Handicap</u>		(0-10)	(11-20)	(21-31)	
		1	2	3	
strongly disagree	1	1	1	0	108
	2	0	1	0	
	3	2	1	0	
neutral	4	2	2	1	
	5	8	12	3	
	6	12	32	8	
strongly agree	7	9	9	4	
		<hr/>	<hr/>	<hr/>	
		34	58	16	

Sex

		(M) 1	(F) 2	
strongly disagree	1	2	0	
	2	1	0	
	3	3	0	
neutral	4	5	0	
	5	20	2	
	6	43	8	
strongly agree	7	15	7	
		89	17	108

Course

		Prairie Dunes	Southwind	Tallgrass	
strongly disagree	1	0	2	0	
	2	0	0	1	
	3	1	1	1	
neutral	4	1	2	2	
	5	9	4	10	
	6	11	17	24	
strongly agree	7	8	4	10	
		30	30	48	108

Observations: Participants answered quite similar in each category. Most golfers felt that rolling fairways increase shote values, answering 5 through 7 with 6 being the most favorable. This is a bit surprising since one main characteristic in the American style golf course is flat fairways devoid of any mounding. Mounding of fairways makes the golfers hit from a variety of stances.

Question 11: What is the maximum depth a greenside sand bunker should have?

Age

	(18-40)	(41-50)	(51 & over)
	1	2	3
1 (1-2')	0	1	3
2 (3-4')	10	11	12
3 (5-6')	20	17	16
4 (7-8')	8	1	3
5 (> 8')	5	0	1
	<hr/>	<hr/>	<hr/>
	43	30	35

108

Years Played

	(2-10)	(12-20)	(21-55)
	1	2	3
1 (1-2')	1	1	2
2 (3-4')	12	8	13
3 (5-6')	17	22	14
4 (7-8')	3	7	2
5 (> 8')	4	1	1
	<hr/>	<hr/>	<hr/>
	37	39	32

108

Handicap

	(0-10)	(11-20)	(21-31)
	1	2	3
1 (1-2')	0	2	2
2 (3-4')	9	19	5
3 (5-6')	16	28	9
4 (7-8')	6	6	0
5 (> 8')	3	3	0
	<hr/>	<hr/>	<hr/>
	34	58	16

108

Sex

	(M) 1	(F) 2
1 (1-2')	1	3
2 (3-4')	23	8
3 (5-6')	47	6
4 (7-8')	12	0
5 (> 8')	6	0
	<hr/>	<hr/>
	87	17

104

Course

	Prairie Dunes	Southwind	Tallgrass
1 (1-2')	0	1	3
2 (3-4')	5	12	16
3 (5-6')	15	16	22
4 (7-8')	5	1	6
5 (> 8')	5	0	1
	<hr/>	<hr/>	<hr/>
	30	30	48

108

Observations: Most golfers felt greenside bunkers should be 5' to 6' in depth. The results are as follows:

- 1) 5' to 6'
- 2) 3' to 4'
- 3) 7' to 8'
- 4) greater than 8'
- 5) 1' to 2'

There was a significant difference in the category of Sex. Most women felt 3' to 4' was sufficient, while most men felt 5' to 6' was the maximum depth.

Question 12: What is the maximum depth a fairway bunker should have? (approximately 150 to 180 yards from the green)

Age

	(18-40)	(41-50)	(51 & over)
	1	2	3
1 (1-2')	11	5	11
2 (3-4')	19	17	18
3 (5-6')	11	7	6
4 (7-8')	2	1	0
5 (> 8')	0	0	0
	<hr/>	<hr/>	<hr/>
	43	30	35

108

Years Played

	(2-10)	(12-20)	(21-55)
	1	2	3
1 (1-2')	6	10	11
2 (3-4')	18	20	16
3 (5-6')	10	9	5
4 (7-8')	3	0	0
5 (> 8')	0	0	0
	<hr/>	<hr/>	<hr/>
	37	39	32

108

Handicap

	(0-10)	(11-20)	(21-31)
	1	2	3
1 (1-2')	9	14	4
2 (3-4')	18	28	8
3 (5-6')	5	16	3
4 (7-8')	2	0	1
5 (> 8')	0	0	0
	<hr/>	<hr/>	<hr/>
	34	58	16

108

<u>Sex</u>	(M) 1	(F) 2	
1 (1-2")	22	5	
2 (3-4')	46	7	
3 (5-6')	18	5	
4 (7-8')	3	0	
5 (> 8')	0	0	
	<hr/>	<hr/>	
	89	17	108

<u>Course</u>	Prairie Dunes	Southwind	Tallgrass	
1 (1-2')	6	11	10	
2 (3-4')	16	12	26	
3 (5-6')	7	6	11	
4 (7-8')	1	1	1	
5 (> 8')	0	0	0	
	<hr/>	<hr/>	<hr/>	
	30	30	48	108

Observations: Most golfers felt 3' to 4' is the maximum depth a fairway bunker should have. There was approximately an even distribution between 1' to 2' and 5' to 6'. The results are as follows:

- 1) 3' to 4'
- 2) 1' to 2'
- 3) 5' to 6'
- 4) 7' to 8'
- 5) greater

There were only 3 responses that a fairway bunker should be 7' to 8' in depth and zero responses that the bunker should be deeper than 8'. It seems golfers feel you should be able to extract the ball towards the hole, for a bunker to be "fair." I disagree. A golfer should be able to hit their ball out of the bunker, but not necessarily towards the hole. If a golfer is able to hit the ball only sideways or backwards, then the bunker is fair.



Question 13: On a short par 4, how far do you feel an unmanicured area should be from the fairway (length of hole -- 300 to 370 yards)

Age

	(18-40)	(41-50)	(51 & over)	
	1	2	3	
1 (0-5 yds)	7	3	3	
2 (6-15 yds)	19	18	17	
3 (15-50 yds)	14	8	11	
4 (> 50 yds)	2	1	4	
	<hr/>	<hr/>	<hr/>	
	42	30	35	107

Years Played

	(2-10)	(12-20)	(21-55)	
	1	2	3	
1 (0-5 yds)	3	4	6	
2 (6-15 yds)	21	19	14	
3 (15-50 yds)	10	13	10	
4 (> 50 yds)	2	3	2	
	<hr/>	<hr/>	<hr/>	
	36	39	32	107

Handicap

	(0-10)	(11-20)	(21-31)	
	1	2	3	
1 (0-5 yds)	7	6	0	
2 (6-15 yds)	14	32	8	
3 (15-50 yds)	9	16	8	
4 (> 50 yds)	3	4	0	
	<hr/>	<hr/>	<hr/>	
	33	58	16	107

Sex

	(M) 1	(F) 2	
1 (0-5 yds)	13	0	
2 (6-15 yds)	42	11	
3 (15-50 yds)	29	4	
4 (> 50 yds)	5	2	
	<hr/>	<hr/>	
	89	17	106

Course

	Prairie Dunes	Southwind	Tallgrass	
1 (0-5 yds)	5	1	7	
2 (6-15 yds)	16	20	18	
3 (15-50 yds)	7	8	18	
4 (> 50 yds)	2	1	4	
	<hr/>	<hr/>	<hr/>	
	30	30	47	107

Observations: On a short par 4 (300 to 370 yards) most golfers felt 6 to 15 yards is a sufficient distance an unmanicured area should be from the fairway. The results are as follows:

- 1) 6 - 15 yards
- 2) 15 - 50 yards
- 3) 0 - 5 yards
- 4) greater than 50 yards

There was no significant difference between each category.

Question 14: On a long par 4, how far do you feel an unmanicured area should be from the fairway? (length of hole -- 430 to 460 yards)

Age

	(18-40)	(41-50)	(51 & over)
	1	2	3
1 (0-5 yds)	3	3	2
2 (6-15 yds)	9	8	11
3 (15-50 yds)	28	14	17
4 (> 50 yds)	2	4	5
	<hr/>	<hr/>	<hr/>
	42	30	35

107

Years Played

	(2-10)	(12-20)	(21-55)
	1	2	3
1 (0-5 yds)	4	2	3
2 (6-15 yds)	12	6	10
3 (15-50 yds)	18	25	16
4 (> 50 yds)	2	6	3
	<hr/>	<hr/>	<hr/>
	36	39	32

107

Handicap

	(0-10)	(11-20)	(21-31)
	1	2	3
1 (0-5 yds)	5	36	1
2 (6-15 yds)	7	16	5
3 (15-50 yds)	19	30	10
4 (> 50 yds)	2	9	0
	<hr/>	<hr/>	<hr/>
	33	53	16

Sex

	(M) 1	(F) 2	
1 (0-5 yds)	8	1	
2 (6-15 yds)	21	6	
3 (15-50 yds)	52	7	
4 (> 50 yds)	8	3	
	<hr/>	<hr/>	
	89	17	106

Course

	Prairie Dunes	Southwind	Tallgrass	
1 (0-5 yds)	3	0	6	
2 (6-15 yds)	7	8	13	
3 (15-50 yds)	16	22	21	
4 (> 50 yds)	4	0	7	
	<hr/>	<hr/>	<hr/>	
	30	30	47	107

Observations: For a long par 4 (430 to 460 yards) the unmanicured area moved farther from the fairway than on the short par 4. The results are as follows:

- 1) 15 to 50 yards
- 2) 6 to 15 yards
- 3) greater than 50 yards
- 4) 0 to 5 yards

This change in results from the previous question is not a surprise. The golfer feels on a short par 4 they can hit a fairway wood or long iron off the tee and still reach the green with a short iron. But on a long par 4 the golfer feels they must hit a driver off the tee so they can reach the green in two strokes. So most of the time a golfer has more control over a fairway wood or long iron than their driver, thus the unmanicured area may be closer to the fairway, stressing accuracy not strength.

Question 15: How far should an unmanicured area be from the green?

Age

	(18-40) 1	(41-50) 2	(51 & over) 3
1 (0-3 yds)	2	2	0
2 (4-10 yds)	17	10	16
3 (11-15 yds)	16	12	15
4 (16-25 yds)	7	5	4
5 (> 25 yds)	0	1	0
	<hr/>	<hr/>	<hr/>
	42	30	35

107

Years Played

	(2-10) 1	(12-20) 2	(21-55) 3
1 (0-3 yds)	2	2	0
2 (4-10 yds)	16	13	14
3 (11-15 yds)	12	18	13
4 (16-25 yds)	6	5	5
5 (> 25 yds)	0	1	0
	<hr/>	<hr/>	<hr/>
	36	39	32

107

Handicap

	(0-10) 1	(11-20) 2	(21-31) 3
1 (0-3 yds)	3	1	0
2 (4-10 yds)	14	22	7
3 (11-15 yds)	10	25	8
4 (16-25 yds)	6	9	1
5 (> 25 yds)	0	1	0
	<hr/>	<hr/>	<hr/>
	33	58	16

107

Sex

	(M) 1	(F) 2
1 (0-3 yds)	4	0
2 (4-10 yds)	36	6
3 (11-15 yds)	32	11
4 (16-25 yds)	16	0
5 (> 25 yds)	1	0
	<hr/> 89	<hr/> 17

Course

	Prairie Dunes	Southwind	Tallgrass	
1 (0-3 yds)	1	3	0	
2 (4-10 yds)	9	14	20	
3 (11-15 yds)	16	9	18	
4 (16-25 yds)	3	4	9	
5 (> 25 yds)	1	0	0	
	<hr/> 30	<hr/> 30	<hr/> 47	107

Observations: The responses of how close an unmanicured area should be from the green were practically the same between 4 to 10 yards and 11 to 15 yards. The results are as follows:

- 1) 4 to 10 yards
- 2) 11 to 15 yards
- 3) 16 to 25 yards
- 4) 0 to 3 yards
- 5) greater than 25 yards

There was no significant difference between each category.

I do feel the closer the approach shot the closer the unmanicured areas should be from the green.

### Further Observations

This section details additional comments participants provided on their questionnaire or directly mentioned to me.

I heard a few derogatory comments about hazards in the middle of fairways. Many golfers felt the hazards were unfair, saying that the middle of the fairway is where the ball is supposed to go. I disagree. Hazards to most golfers means to punish a bad shot. But their main objective is to add variety and interest. As MacKenzie states in his book Golf Architecture, a hazard placed in the exact position a player would naturally go is frequently the most interesting situation, as then a special effort is needed to get over or avoid it. Continuing on this thought, in the book The Game of Golf, Simpson states, "that the true line to the hole should not always be the centre of the fairway, and that the placing of a bunker had a far more serious and useful purpose than merely the punishing of a bad shot."

In Hawtree's book The Golf Course, he states that sand bunkers affect the golfer positively or negatively. The positive bunker effects the player before playing the shot, causing the player to pick a line and type of shot. A negative bunker never really enters a player's thought because the bunker just effects a poorly struck shot.

Lastly, Low, in Concerning Golf, states, "There is hardly such a thing as an unfair bunker. Even the hazard right in the middle of the course at the end of a long tee shot, ... is really quite a fair risk." And again, "But golf need not be played in bee-lines. It is a mistake to suppose that because you hit a shot straight down the middle of the course and find it bunkered you are to fill up the offending hazard. Next time you will play on the true line, not the bee-line ... There seem to me to be far too few 'round the corner' holes in golf."

Another point some participants mentioned was that naturalistic courses "make you feel like you're in Scotland" or this style of golf course is "more fun" to play. This point can be summed up by what a group of golfers mentioned, "we like natural courses, but make it more playable, it definitely rewards you, a person gets more out of it."

The question in the survey dealing with rolling fairways providing more variety of shots as compared to flat fairways, brought up a couple of derogatory comments towards rolling fairways, even though most golfers approved of them. The golfers that did not approve, felt that a flat fairway gave the golfer a "fair" stance and a rolling fairway "cheated the golfer out of a fairway stance." I again disagree. As MacKenzie states in Golf



Architecture, "In almost equally common delusion is that fairways should be flat ... there are few things more monotonous than playing every shot from a dead flat fairway. The unobservant player never seems to realize that one of the chief claims of the best seaside links is the undulating fairways ... on these fairways one hardly ever has a level stance or a level lie. It is this that makes the variety of a seaside course, and variety is everything in golf." He later states, "there is not only much skill required, but an improvement of one's game results in occasionally having to play out of a cupped lie, or from an uneven stance."

A group of lady golfers stated that they approve of rolling fairways but "don't make the slopes too severe." The question then is, what constitutes severe?

Another group of ladies mentioned the course they regularly play on waters its "natural" rough. The ladies asked, why do this? The watering only encourages growth, making the prairie grass taller and thicker. This encourages lost balls, or very difficult shots to be extracted from this growth.

I agree with the comment supporting no watering of native vegetation. The native grasses will survive the summer with only the natural rainfall. Secondly, letting

the grass thin out, golfers can find their ball and may play the shot from the rough.

The last major point a few participants brought to my attention, dealt with sand bunkers. One of the courses I visited had very coarse, heavy sand. This is so high wind, which is common in western Kansas, won't blow the sand out. The bunkers were of the type with faces of sand, not turf. The golfers did not approve of this style of bunkering. The heavy, coarse sand is too difficult to play out of and the sand scratches their clubs.

In a situation where high wind is a problem for sand, the bottom of the trap can be built below existing grade turfing the face of the trap. This will better protect the sand from wind, and there will be less erosion or washout of sand on the face of the bunker. Although some golf architects, such as MacKenzie and Simpson, disagree with this style of bunkering. MacKenzie states in Golf Architecture, "it is suggested that you get a much more natural appearance if the hollows are partly turfed over and the hummocks sanded ... This has the following advantages: the appearance is much more like a seaside course; the sand being above the level of the ground always remains dry. The contrast between white or yellow sand helps one judge distances much more accurately, and enables the ball to be found more easily ..."

In The Golf Course, Hawtree mentions the relation to the site and methods of maintenance should determine the style of bunkering on a particular course. But if a golf architect wants the course to look "Scottish," the grass faced bunker has entered into the vernacular in Scotland.

This research focuses on the determination of attitudes among golfers towards these changes in golf course design practices. The work seeks to find what golfers like and dislike in terms of playability and aesthetics concerning the naturalistic concept in golf course design.

Also looked at is how much naturalistic courses cut maintenance cost, and are there any different maintenance procedures for naturalistic courses. This information was found by talking with golf course superintendents who manage the naturalistic style of golf course.

This study supports the central hypothesis that golfers who regularly play on "naturalistic" golf courses would rather play this style than the more traditional American style of golf course. For golfers surveyed in this study, 67.6% would rather play on a naturalistic style golf course. Also, 80.5% of golfers felt golf courses should utilize to a much greater extent the existing natural landscape character.

Playability is the only aspect in which golfers felt American style golf courses exceeded the naturalistic golf courses (how playable the course is to all levels of golfers). 43.6% of the golfers felt naturalistic courses are not as playable as American style, while 28.7% remained neutral. This suggests that natural areas come into play too much and the grass is too tall or thick for average golfers to play out of. In addition, rolling fairways that provide different types of stances and deep sand bunkers which is characteristic of naturalistic courses are too difficult for the average golfer.

For a better understanding of how the naturalistic courses will better suit the average golfer, questions 7 through 11 deal with playability. These questions pertain to depth of greenside and fairway sand bunkers, rolling fairways and distances of naturalized areas from fairways and greens. Most golfers felt 5-6' to be the maximum depth a greenside sand bunker should be, with 3-4' being the maximum depth a fairway should have. The distance a naturalized area should be from a fairway differs on the length of the hole. On a short par 4 (300 to 370 yards), golfers felt 6-15 yards to be a good distance, but on a long par 4 (430 to 460 yards), the distance is greater, 15 to 50 yards. When golfers were asked how far an unmanicured area should be from a green, the majority of

the responses were between 4 and 10 yards, and 11 to 15 yards. Understanding how golfers feel towards these aspects and utilizing them in the design will give the average golfer a better chance to play a more enjoyable round of golf.

When breaking down each question into demographic responses (age, years played, handicap, sex and course played), most golfers did not have a significant difference.

Question 3 has a significant difference with handicap. Golfers with a higher handicap felt neutral about the ability of prairie grass, wild flowers, dunes and/or mounds to define a fairway. So on a type of golfer course serving higher handicap golfers, the practice of planting trees behind and to the sides of greens and fairways is the best technique to define a golf hole.

Question 4 has a significant difference in age. Golfers age 51 and older would prefer to play a naturalistic style golf course. This may be because older golfers are not concerned about their score or how many golf balls they lose in the naturalized areas.

Question 6 also has a significant difference in age. Most golfers 51 and over felt that shot values are increased while the remaining two groups felt more neutral.

Questions 7 and 11 had significant differences in sex. For both questions, differences may be because women have a harder time recovering from deep sand bunkers and the naturalized areas.

Ron Whitten states in the article, "Bringing the Game down to Earth," some architects feel the naturalization of golf courses is not an economic savings but simply a maintenance reallocation tool. This is not necessarily so. The average total maintenance budgets for naturalistic courses is only slightly higher than the median for courses in their respective region. Each superintendent stated that yearly savings are \$25,400, due to naturalized acreage. Average green and tee size is slightly larger on naturalistic courses but the fairway size is smaller. The amount of water used yearly is slightly higher on naturalistic courses, while the total chemical and fertilizer cost is lower by an average of \$3,100 a year than the median in each region.

The five superintendents all felt they would rather maintain a naturalistic course due to less maintenance cost, aesthetics, less watering, fertilizing and mowing.

Predictions for the future of golf look very bright. In the article The Changing Economics of Golf, McElyea and Kreborian state the economics of golf for the future is very good, resulting from demographic changes, escalating

Kreborian state the economics of golf for the future is very good, resulting from demographic changes, escalating fees and better golf facility management. Demographics attribute two reasons why golf will be more popular in the future. First, the baby boom generation has moved into the 35 to 54 year old age group. This group has the highest golf participation rate of all groups. Secondly, golf is growing in popularity in the 65 and over group, which exhibits the highest per capita play. Also, the National Golf Foundation estimates over the last two years, the number of golfers has grown 24%, to 20.2 million. They also state that between 1988 and 2000, a course a day will have to be built to keep up with this growth. In 1987 only 110 courses were opened in the United States.

These statistics offer a bright future for golf course and architecture. This growth coupled with the emphasis on naturalistic golf courses is essential for preserving the game of golf. This study has shown two important findings: 1) the majority of golfers prefer to play a naturalistic golf course, and 2) superintendents questioned stated a yearly savings on the average of \$25,400 with the utilization of naturalized areas.

The lower maintenance cost will aid in lower greens fee for public and municipal courses and membership dues

for private country clubs. This will enable a wider cross section of society to play golf for recreation and not limit the game to wealthier people.

Lastly, I feel the most important aspect of naturalistic courses is, they work more with their surrounding environment than the more traditional American style of golf course. The question, how much naturalistic courses help preserve or actually enhance the environment is not exactly known. But this study does show that most golfers are ready for a new look in golf courses for the United States.



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## Appendix A





Attitudes of Golfers Towards Naturalistic Courses  
page three

2. Do you feel that better shot values are used when you play on a naturalistic golf course? (shot values - how fairly a course rewards power, finesse and accuracy)

1-----2-----3-----4-----5-----6-----7  
strongly neutral strongly  
disagree agree

3. Do you feel a golfer plans a shot better on a naturalistic golf course?

1-----2-----3-----4-----5-----6-----7  
strongly neutral strongly  
disagree agree

4. Do you feel the playability on a naturalistic course exceeds that of the highly manicured course? (playability - how playable the course is to all levels of golfers)

1-----2-----3-----4-----5-----6-----7  
strongly neutral strongly  
disagree agree

5. Do you feel your overall golf game is better when you regularly play on a naturalistic course?

1-----2-----3-----4-----5-----6-----7  
strongly neutral strongly  
disagree agree

Although the course you play on regularly may not have some of the design features (very shallow or deep bunkers, rolling fairways) listed below, what are your attitudes towards them?





Attitudes of Golfers Towards Naturalistic Courses  
page five

10. On a long par 4, how far do you feel an unmanicured area should be from the fairway?  
(length of hole - 430 - 460 yards)

0 - 5 yds. \_\_\_\_\_  
6 - 15 yds. \_\_\_\_\_  
15 - 50 yds. \_\_\_\_\_  
greater \_\_\_\_\_

11. How far should an unmanicured area be from the green?

0 - 3 yds. \_\_\_\_\_  
4 - 10 yds. \_\_\_\_\_  
11 - 15 yds. \_\_\_\_\_  
16 - 25 yds. \_\_\_\_\_  
greater \_\_\_\_\_

Thank you very much for your participation. If you don't mind I would like to ask your:

Age 18 - 29 \_\_\_\_\_  
30 - 40 \_\_\_\_\_  
41 - 50 \_\_\_\_\_  
51 - 65 \_\_\_\_\_  
over 65 \_\_\_\_\_

Years played \_\_\_\_\_  
Approximate Handicap \_\_\_\_\_  
Gender \_\_\_\_\_

Attitudes of Golfers Towards  
the Characteristics of  
Naturalistic Golf Courses

by  
Stan Gentry

Bachelor of Science, Horticulture  
University of Missouri-Columbia, 1984

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AN ABSTRACT OF A MASTERS THESIS  
submitted in partial fulfillment of the  
requirements for the degree

MASTER OF LANDSCAPE ARCHITECTURE

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KANSAS STATE UNIVERSITY

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## Abstract

Within the last few years some golf course architects within the United States are returning to an old concept in design, the "naturalistic" look, which dates back to the source of the game of golf, Scotland. Golf courses in Great Britain utilize to a much greater extent than in America, the existing features that the land possesses. Their maintenance practices differ in that tees, fairways, greens, and very little of the rough receive attention and the rest of the golf course remains natural. The basic premise of a natural course is to work with, not against, the existing features of the land. The process of naturalization involves a reduction in the level of care of roughs and hazards, a minimization of the principle playing areas and a concentration of maintenance efforts on these smaller playing surfaces so as to leave as much of the landscape character of the course in a more natural condition.

There are three main reasons why more and more golf courses are utilizing the naturalistic concept. First, the rising cost of maintenance. Some golf courses are reducing the area to maintain due to the rising cost of fuel, pesticides, herbicides, fungicides and fertilizers. Secondly, environmental factors such as the availability of water for irrigation and the possible threat of surface and groundwater contamination due to chemicals applied to

turfgrass. The third factor is the increased cost to build a golf course.

This research focuses on the determination of attitudes among golfers towards these changes in golf course design practices. The work seeks to find what golfers like and dislike in terms of playability and aesthetics concerning the naturalistic concept in golf course design.

Also looked at is how much naturalistic courses cut maintenance cost, and are there any different maintenance procedures for naturalistic courses. This information was found by talking with golf course superintendents who manage the naturalistic style of golf course.